

Date: Thursday, 29/05/2008 9:05:40 AM  
 User: Julie Lecocq

## Process Sheet

<b>Customer</b> :	CU-DAR001 Dart Helicopters Services	<b>Drawing Name</b> :	412 X-TUBE INST, LOW NARROW FWD
<b>Job Number</b> :	39548	<b>Part Number</b> :	D412664105TRN
<b>Estimate Number</b> :	13209	<b>Drawing Number</b> :	D412-664-145 REV C
<b>P.O. Number</b> :		<b>Project Number</b> :	N/A
<b>This Issue</b> :	29/05/2008	<b>S.O. No.</b> :	
<b>Prsht Rev.</b> :	NC	<b>Drawing Revision</b> :	C
<b>First Issue</b> :	1/1	<b>Material</b> :	
<b>Previous Run</b> :	39547	<b>Due Date</b> :	13/06/2008
<b>Written By</b> :		<b>Qty:</b>	1 Um: Each
<b>Checked &amp; Approved By</b> :	<i>JMO 08.5.29</i>		
<b>Comment</b> :	Est Rev: A New Issue 08-03-06 DD verified by: ec Est Rev B 08.04.02 Removed polish EC verified by: DD		

## Additional Product

Job Number:



<b>Seq. #:</b>	<b>Machine Or Operation:</b>	<b>Description :</b>
----------------	------------------------------	----------------------

1.0	D6019128	Crosstube Material
-----	----------	--------------------



**Comment:** Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6019-128 Crosstube *332310*

Check OD = 2.7500"; ID =

*am 08.06.230*

2.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE
-----	------------	----------------------------

**Comment:** MORISEIKI

1-Fill tube with sand &amp; install plugs DT8534 on both ends as per Folio FA689

2-Turn first side as per Folio FA689

3- File transition lines smooth.

*am 08.06.25 ①*

3.0	QC1	INSPECT ALL DIM TO DIM SHEET
-----	-----	------------------------------

**Comment:** INSPECT ALL DIM TO DIM SHEET*am 08.06.25 ①*

4.0	MORI SEIKI	MORI SEIKI CNC LATHE LARGE
-----	------------	----------------------------

**Comment:** MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA689

3- File transition lines smooth.

3- Remove sand and plugs

*am 08.06.25 ①*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
				016-010				

NOTE: Date & initial all entries

Date: Thursday, 29/05/2008 9:05:40 AM  
User: Julie Lecocq

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 412 X-TUBE INST, LOW NARROW FWD

Job Number: 39548

Part Number: D412664105TRN

Job Number:



Seq. #:

Machine Or Operation:

Description :

4-Scribe part # and batch # using vibrating stylus as per Dwg D412-664-145  
engrave on outside of tube)

Inside of Cuff(Donot

Q.m 08.06.25①

5.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

Q.m 08.06.25①

6.0

QC8

SECOND CHECK



Comment: SECOND CHECK

AWN  
8-6-25

7.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

ET 08-06-26

8.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

DP 8-6-26

9.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Identify and stock in kanban rack

Location: X-tube cell

ET 08-06-26

10.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

08/07/01 HJ

Job Completion



mf 08-06-30

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

<b>DART AEROSPACE LTD</b>		<b>Work Order:</b> 39548
<b>Description:</b> Crosstube Assembly (412 Low Narrow Fwd)		<b>Part Number:</b> D412-664-145
<b>Inspection Dwg:</b> D412-664-145 Rev: C		<b>Page 1 of 1</b>

### FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.740	+0.005/-0.000	2.740	/		
	2.490	+0.005/-0.000	2.491	/		
	2.557	+0.005/-0.000	2.562	/		
	2.624	+0.005/-0.000	2.627	/		
	2.692	+0.005/-0.000	2.693	/		
SIDE B	2.740	+0.005/-0.000	2.741	/		
	2.490	+0.005/-0.000	2.492	/		
	2.557	+0.005/-0.000	2.562	/		
	2.624	+0.005/-0.000	2.628	/		
	2.692	+0.005/-0.000	2.697	/		
	124.48	+/-0.020	124.480	/		

<b>Measured by:</b> A.M	<b>Audited by:</b> AWM	<b>Prototype Approval:</b>	N/A
<b>Date:</b> 08.06.25	<b>Date:</b> 8-6-25	<b>Date:</b>	N/A

Rev	Date	Change	Revised by	Approved
A	08.04.21	New Issue (P/O D412-664-105)	KJ/DD	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

**DART**

DESIGN <i>QP</i>	DRAWN BY <i>QP</i>	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D412-664-145	REV. C SHEET 1 OF 3
DATE 07.03.29		TITLE CROSSTUBE ASS'Y (412 LOW-N FWD) NTS	
A	06.12.21	NEW ISSUE	
B	07.03.01	CHG RUBBER CUSHION	
C	07.03.29	CHG CLAMP & RUBBER CUSHION LGTH.	

**RELEASED**07.04.24 *[Signature]***PARTS LIST:**

Qty	Part Number	Description
X	D412-664-145	CROSSTUBE ASSEMBLY (412 LOW-NARROW FWD)
1	D6019-128	CROSSTUBE
1	D2856-250-842	ABRASION STRIP
2	D2893-1	SUPPORT
1	D3189-3	CHAFING SHIELD
4	D3595-063-450	RUBBER CUSHION
2	MS21920-24	CLAMP
4	MS21920-25	CLAMP (OR MS21920-26)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

**GENERAL NOTES:**

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6019-128  
FINISHED LENGTH =  $124.48 \pm 0.020$  (BEFORE BENDING/TRIMMING)
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR D3189-3 CHAFING SHIELD AND ASSOCIATED HARDWARE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-XXX-YYY ABRASION STRIPS WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE TO D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY

RETURN TO  
ENGINEERINGUNCONTROLLED COPY  
SUBJECT TO AMENDMENTWITHOUT NOTICE  
WORK ORDERNO. 39548**Copyright © 2006 by DART AEROSPACE LTD**

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

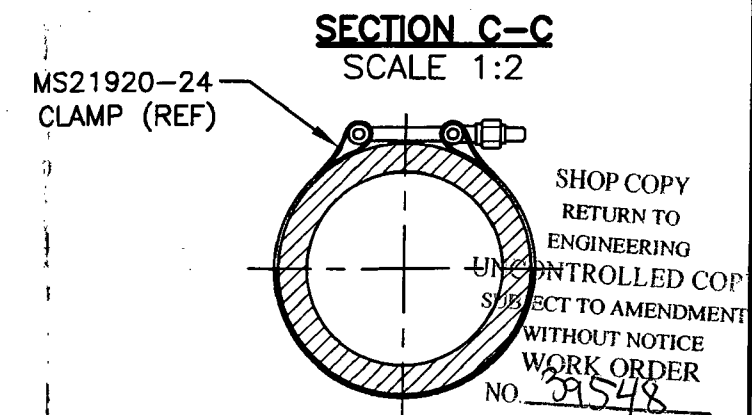
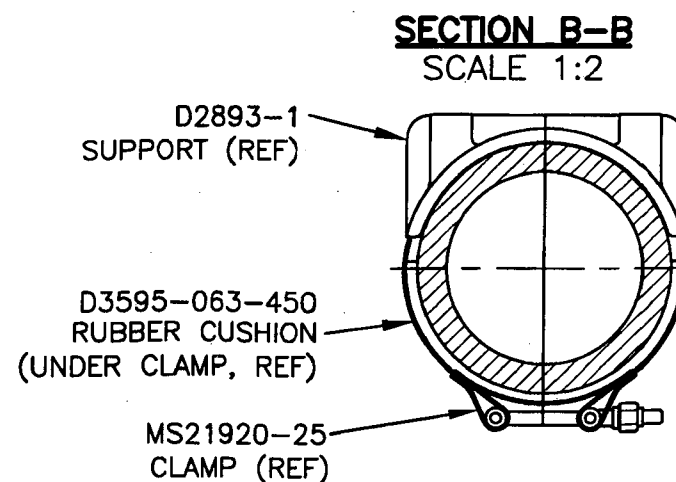
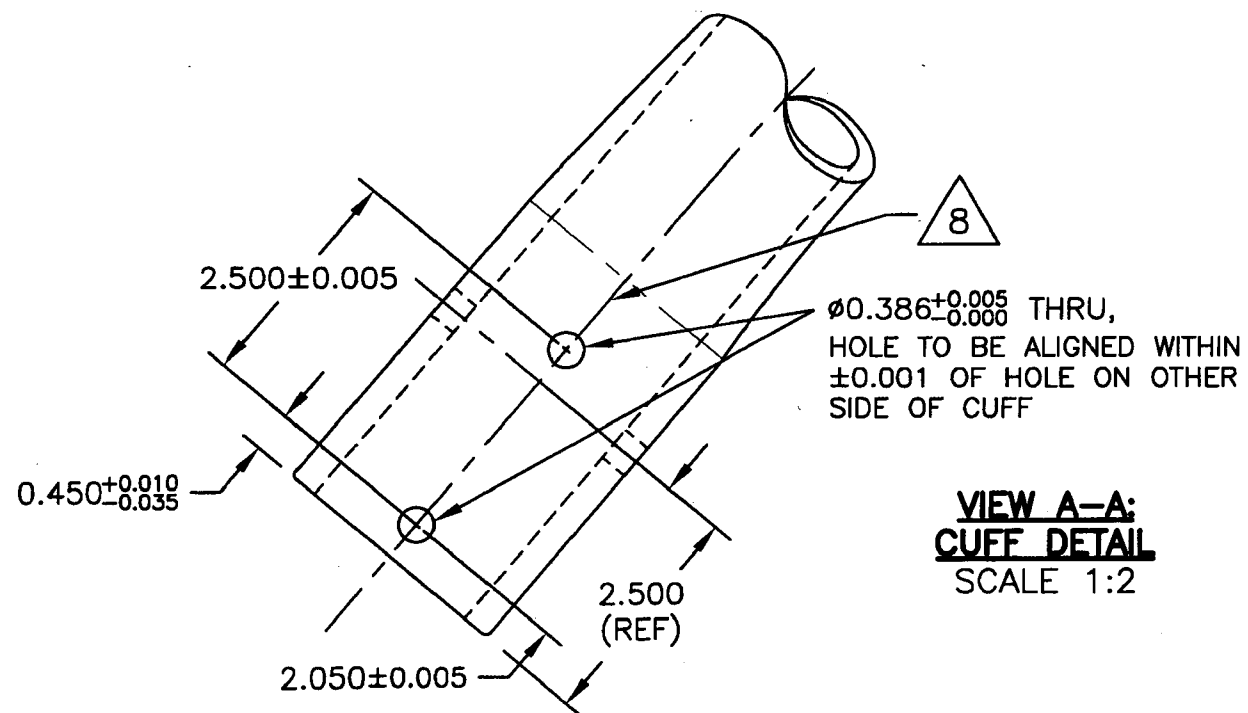
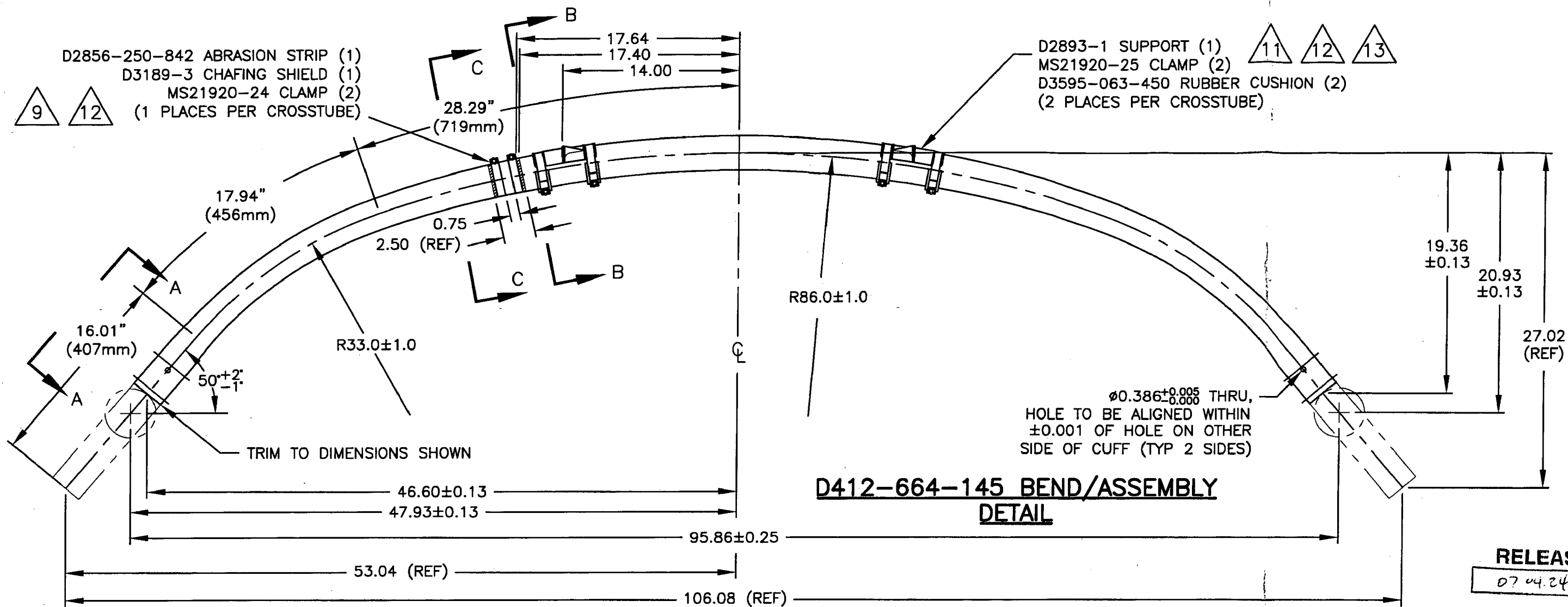
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



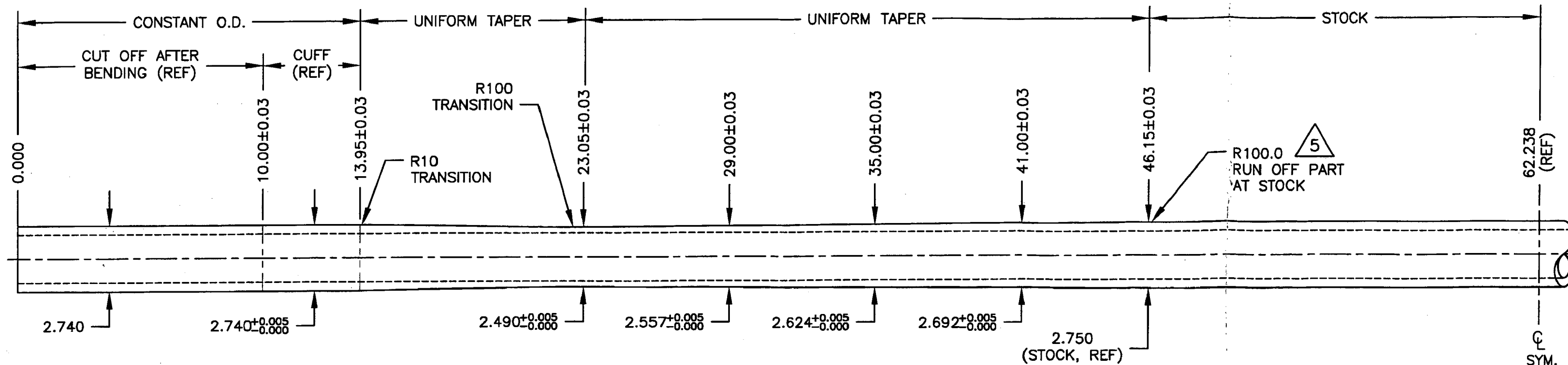


COPYRIGHT © 2006 BY DART AEROSPACE LTD.

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL  
 AND IS SUPPLIED ON THE EXPRESS CONDITION  
 THAT IT IS NOT TO BE USED FOR ANY PURPOSE  
 OR COPIED OR COMMUNICATED TO ANY OTHER  
 PERSON WITHOUT WRITTEN PERMISSION FROM  
 DART AEROSPACE LTD.

DESIGN 9P	DRAWN BY 9P	<b>DART</b>	DART AEROSPACE LTD. HARRISBURG, ONTARIO, CANADA
CHECKED H	APPROVED H	DRAWING NO. D412-664-145	REV. C SHEET 2 OF 3
DATE 07.03.29		TITLE CROSSTUBE (412 LOW-NARROW FWD)	SCALE 1:8





# **D412-664-145 MACHINING DETAIL**

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 39548

**RELEASED**

07.04.1988

COPYRIGHT © 2006 BY DART AEROSPACE LTD.

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL  
AND IS SUPPLIED ON THE EXPRESS CONDITION  
THAT IT IS NOT TO BE USED FOR ANY PURPOSE  
OR COPIED OR COMMUNICATED TO ANY OTHER  
PERSON WITHOUT WRITTEN PERMISSION FROM  
DART AEROSPACE LTD.

DESIGN

qp

DRAWN BY

qp

**DART**

**DART AEROSPACE LTD.**  
HAMMERSLEY, ONTARIO, CANADA

CHECKED

///

APPROVED

///

DRAWING NO.

D412-664-145

REV. C

SHEET 3 OF 3

DATE

07.03.29

TITLE

CROSSTUBE (412 LOW-NARROW FWD)

SCALE

1:4

